IN THE SPECIFICATION:

Please amend the paragraph starting at page 1, line 15 as follows.

--Various propositions have been made for the inkjet recording method that uses a liquid other than the ink jet ink for improving image quality, where the liquid is applied to a recording medium before the recording ink is ejected to form an image. There are, for example, a method in which a liquid containing a basic polymer is applied, and then an ink containing an anionic dye is applied (Japanese Patent Application Laid-Open No. S63-60783A), a method in which a liquid containing a chemical species and a liquid containing a compound reactive with the reactive species are mixed on the recording medium (Japanese Patent Application Laid-Open No. S63-22681A), and a method in which a liquid containing an organic compound having two or more cationic groups per molecule is applied, and then an ink containing an anionic dye is applied (Japanese Patent Application Laid-Open No. S63-299971A). Furthermore, there are a method in which an acid liquid containing succinic acid or the like is applied, and then an ink containing an anionic dye is applied (Japanese Patent Application Laid-Open No. S64-09279A), and a method in which a liquid insolubilizing a dye is applied before an ink is applied (Japanese Patent Application Laid-Open Nos. S64-63185A and S64-69381A).--

Please amend the paragraph starting at page 2, line 14 as follows.

--These methods described above are to inhibit feathering of the image, and to improve durability of the image by the precipitation of the dye applied on a recording medium. These methods, however, are not so effective in preventing bleeding between color inks of

different colors, ~~and~~ since the distribution of the dye precipitated on the recording medium tends to be uneven, which may cause unevenness in the image. Particularly, if normal paper is used as a recording medium, pulp fibers ~~are~~ do not ~~sufficiently applied~~ receive sufficient application, and this tendency of unevenness sometimes becomes more conspicuous.

Please amend the paragraph starting at page 2, line 26 as follows.

--On the other hand, there has been proposed, for pigment ink systems, an ink set comprised of an ink containing a pigment dispersion and an ink containing a polyvalent metal in order to alleviate bleeding in a multicolor print (Japanese Patent Application Laid-Open No. ~~H09-18850A~~ H09-118850A). This method, however, has the constraint that the polyvalent metal to be contained in the ink should be compatible with the coloring material in view of ink stability, as well as a problem of insufficient image density.--

Please amend the paragraph starting at page 3, line 25 as follows.

--Thus, the object of the present invention is to provide a reaction solution, a set of a reaction solution and an ink, an inkjet recording apparatus and an image recording method that can achieve a high level of optical density stably from the initial stage to the later stages of use.--

Please amend the paragraph starting at page 6, line 25 as follows.

--FIG. 5 is a longitudinal sectional view showing one example of an ink cartridge; and--

Please amend the paragraph starting at page 7, line 6 as follows.

--The reaction solution of the present invention is characterized in that it contains polyvalent metal ions, has a pH of 2 or higher, and it has a buffering action for pH variation. Here, the buffering action means it can maintain the pH within the range of 0.5, more preferably of 0.3 before and after the addition of 1.0 ml of a 0.1 N aqueous lithium hydroxide solution to 50 ml of the reaction solution.--

Please amend the paragraph starting at page 7, line 14 as follows.

--The remarkable effect of the present invention is considered~~, but~~ to be due to the following, although this is not substantiated~~, as follows~~.

Please amend the paragraph starting at page 7, line 17 as follows.

--When the organic solvent in the reaction solution is oxidized to generate acid groups, these acid groups will react with the polyvalent metal ions, and the counter ion of the polyvalent metal ion (anion) will react with a proton of the acid group to form an acid, whereby the pH of the reaction solution drops. The pH variation will affect the reactivity of the reaction solution, which will change image quality. For example, if the reactivity of the reaction solution is reduced, the coloring material permeates through the recording medium, and therefore a high level of optical density cannot be achieved, or the coloring material reaches close to the backside

of the recording medium (so called strike-through of coloring material). The reaction solution of the present invention has a buffering action, thus making it possible to inhibit the reduction in pH as much as possible.--

Please amend the paragraph starting at page 8, line 7 as follows.

--In addition, ~~since~~ metal ions resulting from a buffer used for obtaining a buffering action also contribute to destabilization of the coloring material to achieve a high level of optical density that could not be achieved just by using polyvalent metal ions.--

Please amend the paragraph starting at page 8, line 20 as follows.

--The present invention will be described <u>in</u> more ~~in~~ detail below with a preferred embodiment.

Please amend the paragraph starting at page 9, line 15 as follows.

--<Polyvalent Metal Ions>

Preferable polyvalent metal ions that may be used in the reaction solution according to the present invention include, but <u>are</u> not limited to, bivalent metal ions such as Ca^{2+}, Cu^{2+}, Ni^{2+}, Mg^{2+}, Zn^{2+}, Sr^{2+} and Ba^{2+}, and trivalent metal ions such as Al^{3+}, Fe^{3+}, Cr^{3+} and Y^{3+}, for example. Polyvalent metal ion is added in the reaction solution as a salt of a polyvalent metal. Such a salt is a water soluble metal salt comprising a polyvalent metal ion described above and a counteranion of the polyvalent metal ion. Preferable negative ions for forming salts

include, but are not limited to, Cl^-, NO_3^-, I^-, Br^-, ClO_3^-, SO_4^{2-}, CO_3^{2-}, CH_3COO^- and $HCOO^-$, for example.--

Please amend the paragraph starting at page 10, line 2 as follows.

--The content of polyvalent metal salt in the present invention is preferably not less than 0.01% and not higher than 20% by weight based on the total amount of reaction solution in view of the effect of the present invention. For full exhibition of ink-destabilizing function, it is preferable that the reaction solution contains 0.01% or more of polyvalent metal salt. On the other hand, as long as the pH of the reaction solution is in the preferred range described previously, the content of the polyvalent metal salt in the reaction solution can be more than 20%. This, however, is not so preferable because the amount of material having a buffering action should be increased, and much improvement in the ink-destabilizing function is not expected with the content of polyvalent metal salt exceeding 20%. The content of polyvalent metal ion is preferably in the range of 0.01% to 10% by weight based on the total amount of reaction solution.--

Please amend the paragraph starting at page 11, line 4 as follows.

--In addition, it has been found that a strong acid salt of a polyvalent metal ion having a higher ink-destabilizing ability causes ~~more~~ a greater pH drop. When the inventors studied nitrates of various polyvalent metal ions using an aqueous dispersion of 4 wt% carbon black (dispersant: styrene-acrylic acid, acid value 200, content of dispersant (wt%)/content of pigment (wt%) = 0.2), the ink-destabilizing ability of these salts and the pH drop were both in the

order of Fe^{3+}, Y^{3+}, Al^{3+} > Cu^{2+}, Ca^{2+} > Mg^{2+}, Sr^{2+}. Thus, when a strong acid salt of a polyvalent metal shown above is used, it is preferable that the salt content in the reaction solution is 0.2 wt% or higher with Fe^{3+}, Al^{3+} and Y^{3+}, 0.5 wt% or higher with Ca^{2+} and Cu^{2+}, and 1.0 wt% or higher with Mg^{2+} and Sr^{2+} in view of reactivity with ink.--

Please amend the paragraph starting at page 11, line 20 as follows.

--With a salt of Mg^{2+} or Sr^{2+} having a relatively low ink-destabilizing ability, a larger amount must be contained to achieve the same ink-destabilization as with a salt of Fe^{3+}, Al^{3+} or Y^{3+} having a higher destabilizing ability, so that a pH drop with time is more likely to occur.--

Please amend the paragraph starting at page 13, line 8 as follows.

--In the present invention, the pH of the reaction solution is 2 or higher. If the pH is lower than 2, not only ~~that a~~ is the remarkable effect of the present invention ~~is~~ hard to ~~be achieved~~ achieve, but also the components in the reaction solution erode the surfaces of the recording apparatus members, such as ~~a~~ the tank and ~~a~~ the roller, and components of the members elute in the reaction solution, which will affect the image ~~quatlity~~ quality. In addition, in the present invention, the pH of the reaction solution is maintained preferably at ~~pH2~~ pH 2 to 7, more preferably at 3 to 6. Within this pH range, the polyvalent metal ion can exist in the reaction solution more stably, thus both the sufficient reactivity of the reaction solution, and a sufficient buffering action can be achieved, maintaining long-term storage stability of the reaction solution.--

Please amend the paragraph starting at page 14, line 5 as follows.

--<Aqueous Medium>

The reaction solution of the present invention is made by dissolving or dispersing the above described components in an aqueous medium, but a mixed solvent of water and a water-soluble organic solvent is usually used. For the water-soluble organic solvent, those having the effect of preventing the reaction solution from drying are especially preferable. Specific examples include alkyl alcohols having 1 to 4 carbon atoms such as methyl alcohol, ethyl alcohol, n-propyl alcohol, isopropyl alcohol, n-butyl alcohol, sec-butyl alcohol and tert-butyl alcohol; amides such as dimethylformamide and dimethylacetamide; ketones or ketoalcohols such as acetone and diacetone alcohol; ethers such as tetrahydrofuran and dioxane; alkylene diols such as 1,2-hexanediol; polyalkylene glycols such as polyethylene glycol and polypropylene glycol; alkylene glycols of which the alkylene group has 2-6 carbon atoms such as ethylene glycol, propylene glycol, ~~butyrene~~ butylene glycol, triethylene glycol, 1,2,6-hexanetriol, thiodiglycol, hexylene glycol and diethylene glycol; lower alkyl ether acetates such as polyethyleneglycol monomethyl ether acetate; glycerin; lower alkyl ethers of polyhydric alcohols such as ethyleneglycol monomethyl (or ethyl) ether, diethyleneglycol methyl(or ethyl) ether, and triethyleneglycol monomethyl (or ethyl) ether; polyhydric alcohols such as trimethylolpropane and trimethylolethane; N-methyl-2-pyrrolidone, 2-pyrrolidone, 1,3-dimethyl-2-imidazolidinone. A water-soluble organic solvent, as listed above, can be used alone or as a mixture. As water, demineralized water is preferably used.--

Please amend the paragraph starting at page 15, line 24 as follows.

--<Polymer Compounds>

The reaction solution of the present invention may further contain a polymer compound to improve abrasion resistance of the recorded matter. According to studies by the inventors, when the reaction solution contains a polymer compound, the change in pH of the reaction solution may become more significant. It is considered that oxidization of the polymer compound affects the pH of the reaction solution as in the case of oxidization of the organic solvent. Thus, if the reaction solution contains a polymer compound, it is very effective for the solution to have the above-described buffering action. That is, the buffering action of the reaction solution according to the present invention is more effective when the reaction solution contains not only the polyvalent metal ion for ink-destabilization but also a polymer compound for the purpose of improving image fastness of the recorded image than when the reaction solution contains only the polyvalent metal ion.--

Please amend the paragraph starting at page 16, line 18 as follows.

--The polymer compound for use in the reaction solution of the present invention is preferably a nonionic water-soluble polymer that does not affect directly the reaction between the ink component such as the coloring material and the polyvalent metal ion in the reaction solution. Specific examples include, but are not limited to, polyacryl amide, polyvinyl pyrolidone, water-soluble cellulose such as carboxymethyl cellulose, hydroxymethyl cellulose and hydroxypropyl cellulose, and resins such as polyvinyl methyl ether, polyvinyl acetal and polyvinyl alcohol, for example. It is possible to use a polymer having an anion unit or cation unit added to such a nonionic polymer as long as the ink and the reaction solution can retain their

respective essential performance in image formation. Furthermore, the above described polymer compound is ideally a water-soluble polymer, but may be a dispersion such as a latex or emulsion.--

Please amend the paragraph starting at page 19, line 1 as follows.

--[Ink]

The reaction solution of the present invention having the composition described above is used with at least one ink for image formation. Particularly, the reaction solution is used for recording in combination with an ink containing a coloring material dispersed or dissolved in an aqueous medium by the action of ionic groups, whereby the previously described preferable effect is achieved in inkjet recording. Inks suitably used in the present invention include pigment inks using pigments as coloring materials (micro-capsulated pigments, colored resins and the like are also categorized as pigments in this application). Particularly, when the reaction solution of the present invention is used for image formation with a pigment ink wherein a pigment is dispersed stably in an aqueous medium by the action of ionic groups, the coloring material agglomerates on the recording medium to form a high quality image. Thus, coloring materials constituting the pigment ink for use in the present invention include a pigment having anionic groups chemically bound on the surface, and a composition of a pigment as a coloring material and an anionic dispersant. Components such as pigments and the aqueous medium constituting the ink will be described in detail below.

Please amend the paragraph starting at page 20, line 4 as follows.

--<Carbon black>

As carbon black, a carbon black pigment such as furnace black, lampblack, acetylene black or channel black can be used: examples of which include Raven 7000, Raven 5750, Raven 5250, Raven 5000, Raven 3500, Raven 2000, Raven 1500, Raven 1250, Raven 1200, Raven 1190ULTRA-II, Raven 1170, Raven 1255 (manufactured by Columbian Chemicals Company); ~~BlackPearls~~ BlackPearls L, Regal 400R, Regal 330R, Regal 660R, Mogul L, Monarch 700, Monarch 800, Monarch 880, Monarch 900, Monarch 1000, Monarch 1100, Monarch 1300, Monarch 1400 and ~~Valcan~~ Vulcan XC-72R (manufactured by Cabot Corporation); ColorBlack FW1, ColorBlack FW2, ColorBlack FW2V, Color Black FW18, Color Black FW200, Color Black S150, Color Black S160, Color Black S170, Printex 35, Printex U, Printex V, Printex 140U, Printex 140V, SpecialBlack 6, SpecialBlack 5, SpecialBlack 4A and SpecialBlack 4 (manufactured by Degussa AG); and No. 25, No. 33, No. 40, No. 47, No. 52, No. 900, No. 2300, MCF-88, MA600, MA7, MA8 and MA100 (manufactured by Mitsubishi Chemical Corporation). However, carbon black is not limited thereto, but well known carbon black can be used. Further, magnetic microparticles such as magnetite and ferrite as well as titanium black or the like may also be used as a black pigment.--

Please amend the paragraph starting at page 23, line 6 as follows.

--In addition, the acid value of the dispersant is preferably 300 mg KOH/g or less in view of compatibility between the reliability ~~as~~ of the ink, such as the discharge stability and storage stability, and the reactivity with the reaction solution. The acid value of the dispersant is more preferably 100 mg KOH/g to 300 mg KOH/g. In addition, the amount of dispersant added

is preferably 0.1 to 3-fold based on the content (wt%) of the coloring material in the ink for the same reason as with the acid value, and is more preferably 0.2 to 2-fold. If the acid value of the dispersant or the addition amount of the dispersant is increased in view of reliability of the ink, the ink tends to become more stable to the reaction solution. In this case, a sufficient level of image performance can be achieved by increasing the amount of polyvalent metal ion in the reaction solution, which, however, may cause a pH drop in the reaction solution. Therefore, it is preferable that the amount of a substance having a buffering action is also ~~increase~~ increased as required.--

Please amend the paragraph starting at page 23, line 27 as follows.

--<Self-Dispersing Pigment>

--In the present invention, the pigment may be a self-dispersing pigment, a pigment ~~dispersing~~ dispersed in an aqueous medium without using a dispersant, which is obtained by binding an ionic group (anionic group) to the surface of the pigment. One example of such ~~pigments~~ a pigment is self-dispersing carbon black. Self-dispersing carbon black is, for example, carbon black having an anionic group bound on its surface (anionic carbon black). The self-dispersing pigment will be described below using carbon black as an example.--

Please amend the paragraph starting at page 25, line 18 as follows.

--Other methods for producing anionically charged self-dispersing carbon black include, for example, a method in which carbon black is oxidization-treated with sodium hypochlorite. For example, a –COONa group can be chemically ~~boned~~ bonded to the surface of

carbon black by this method.--

Please amend the paragraph starting at page 29, line 3 as follows.

--The amount of a water-soluble organic solvent contained in an ink used in the present invention ~~is~~ may be, but is not limited ~~thereto~~ to, preferably 3 to 50% by weight based on the total amount of ink. Further, the amount of water contained in an ink is preferably 50 to 95% by weight based on the total amount of ink. Furthermore, besides the components described above, a humectant may be added as required as a matter of course, and also a surfactant, an anti-foam agent, a preservative, an anti-mold agent and the like may be added for providing an ink having desired ~~property values~~ properties.--

Please amend the paragraph starting at page 34, line 17 as follows.

--The sheet-feeding cassette 16 is detachable from the main body of the image forming apparatus. The sheets of recording paper 19 are stacked on the sheet-feeding tray 17 in the sheet-feeding cassette 16. At the time of sheet feeding, the uppermost sheet is pressed against a sheet-feeding roller 10 by a spring 18 pressing upward against the sheet-feeding tray 17. This sheet-feeding roller 10 is nearly ~~semicircle~~ semi-circular in cross section, and rotated by a motor (not shown) to feed only the uppermost recording paper 19 with a separation claw (not shown).--

Please amend the paragraph starting at page 35, line 1 as follows.

--The separately fed recording paper 19 is conveyed along a guide surface 16A of

the sheet feeding cassette 16 and a guide surface 27A of a paper guide 27 by the action of a large diameter intermediate roller 12 and a small diameter coating roller 6 pressed against the intermediate roller 12. These guide surfaces are curved in an arc concentric with the intermediate roller 12. Thus, the recording paper 19 is conveyed along these guide surfaces 16A and 27A to reverse its conveyance direction. That is, the printing side of the recording paper 19 faces downward until the recording paper 19 reaches the intermediate roller 12 from the sheet-feeding tray 17, but faces upward when the recording paper 19 faces ~~to~~ the recording head 1. Thus, the printing side of the recording paper always faces out of the image forming apparatus.--

Please amend the paragraph starting at page 35, line 18 as follows.

--The reaction solution applying means is provided in the sheet-feeding cassette 16, and comprises a supply tank 22 for supplying a reaction solution 15, ~~the~~ rotatably supported supply roller 13, ~~rotatably supported~~ of which the circumferential face is partly dipped in the tank 22, and the coating roller 6, placed ~~in~~ parallel to and in contact with the supply roller 13 to rotate in the same direction. Further, the coating roller 6 is arranged in such a manner that its circumferential face is in contact with and parallel to the intermediate roller 12 that conveys the recording paper 19. Thus, when the recording paper 19 is conveyed, the intermediate roller 12 and the coating roller 6 rotate in association with rotation of the intermediate roller 12. As a result, the reaction solution 15 is supplied to the circumferential face of the coating roller 6 by a supply roller 13, and the reaction solution is applied uniformly by the coating roller 6 to the printing side of the recording paper 19 held between the coating roller 6 and the intermediate roller 12.--

Please amend the paragraph starting at page 36, line 12 as follows.

--In addition, the image forming apparatus is provided with a float 14 in the supply tank 22. This float 14 is smaller in specific gravity than the reaction solution 15, and floats on the surface of the reaction solution, thereby enabling the residual amount of reaction solution to be visually checked externally through a level indication window 21 made of a transparent member.--

Please amend the paragraph starting at page 36, line 20 as follows.

--FIG. 2 shows a level indicator viewed from the front. In the level indicator, an indicator indicating a level of reaction solution is provided along the long direction of the level indication window 21. In this figure, the tank is full with the reaction solution when the level of the reaction solution or the float 14 reaches the position marked as "Full". On the other hand, if the level of the reaction solution or the float 14 is in the position marked as "Add", it indicates that the level of reaction solution is low. Thus, one can easily know that the reaction solution should be supplied by seeing that the level of the reaction solution 15 gradually drops and the float 14 reaches the Add line.--

Please amend the paragraph starting at page 37, line 7 as follows.

--To supply the reaction solution, the sheet feeding cassette 16 is pulled out of the main body of the image forming apparatus, and the tip of an injector 23 is inserted into an inlet 20 made of a split-rubber member to inject the reaction solution into the supply tank 22, as shown in FIG. 3.--

Please amend the paragraph starting at page 39, line 14 as follows.

--Another example of an inkjet recording apparatus is shown in FIG. 4. In FIG. 4, the blade 61 is a wiping member, one end of which is a fixed end held by a blade-holding member ~~to~~ in the form of a cantilever. The blade 61 is provided at a position adjacent to a region in which a recording head 65 operates, and in this example, is held in such a form that it protrudes into the path of the recording head 65.--

Please amend the paragraph starting at page 43, line 6 as follows.

--<Ink Cartridge>

FIG. 5 shows one example of an ink cartridge for storing ink for feeding ink to the recording head through an ink feeding member such as a tube. In the drawing, reference numeral 40 denotes a member constituting the ink cartridge 45, an ink storage portion such as an ink bag, whose tip is equipped with a rubber stopper 42. The ink in the ink bag 40 can be fed to the recording head by inserting a needle (not shown in the figure) into the stopper 42. Numeral 44 ~~designate~~ designates an ink absorber for receiving waste ink. For the ink storage portion, its surface in contact with ink is preferably made of polyolefin, particularly polyethylene. Such a cartridge is configured such that the cartridge can be attached to and detached from a recording head 901 discharging the ink or reaction solution, and the ink or reaction solution is supplied to the recording head 901 when the cartridge 45 is mounted on the recording head.--

Please amend the paragraph starting at page 45, line 20 as follows.

--<Example 3>

Composition of Reaction ~~Solution 3)~~ Solution 3

yttrium nitrate	10%
potassium acetate	1%
trimethylolpropane	20%
propylene glycol	20%
acetylene glycol/ethylene oxide adduct (trade name: Acetylenol EH)	1%
water	the rest

The pH of the reaction solution 3 described above was 4.5, and the viscosity was 5.4 mPa•s. When 1.0 ml of a 0.1 N aqueous lithium hydroxide solution was added to 50 ml of this reaction solution, pH was 4.6, showing the buffering action of this solution.--

Please amend the paragraph starting at page 46, line 20 as follows.

--<Comparative Example 2>

Composition of Reaction Solution 5

calcium nitrate	10%
trimethylolpropane	20%
propylene glycol	20%
acetylene glycol/ethylene oxide adduct (trade name: Acetylenol EH)	1%
water	the rest

The pH of the reaction solution 5 described above was 7.5, and the viscosity was 5.0 mPa•s. When 1.0 ml of a 0.1 N aqueous lithium hydroxide solution was added to 50 ml of this reaction

solution, ~~The~~ the pH was 8.9, showing that the reaction solution had no buffering action.--

Please amend the paragraph starting at page 47, line 24 as follows.

--<Pigment Dispersion Bk>

10 parts of pigment (carbon black (trade name: Mogul L manufactured by ~~Cablack~~ Cabot Co., ~~Ltd.)~~ Ltd.)), 20 parts of anionic polymer P-1 (styrene-acrylic acid copolymer, acid value 200, weight average molecular weight 10,000, aqueous solution with the solid content of 10%, neutralizing agent: potassium hydroxide) and 70 parts of pure water were mixed, and placed in a batch-type vertical sand mill (manufactured by IMEX Co., Ltd.) with 150 parts of zirconia bead of 0.3 mm diameter. The mixture was dispersed for 5 hours while cooling by water. This dispersion was centrifuged to remove coarse particles to obtain a pigment dispersion Bk. The solid content of this Bk was about 12% and the weight average particle size ~~of~~ was 120 nm.--

Please amend the paragraph starting at page 49, line 7 as follows.

--First, the reaction solutions were each applied on PPC Paper (manufactured by Canon Inc.). A bar coater was used for the reaction solutions of Examples 1 and 2 and Comparative Examples 1, 2 and 3, and for the solution of Example 3, a coating roller was used. Immediately after coating, a solid print of 2 × 2 cm square was printed with the black ink using BJS 700 (manufactured by Canon Inc.), and the level of strike-through of the black ink was visually observed from the backside of the print to make evaluations according to the criteria below. The results are shown in Table 1. Images obtained in Examples 1 to 3 had a very high image density.--

Please amend the paragraph starting at page 50, line 3 as follows.

--Furthermore, ~~when~~ the reaction solutions were stored at 60°C for one month, were used for printing and were evaluated on strike-through in the same manner as above. With the reaction solutions of Examples 1 to 3 and Comparative Example 1, strike-through evaluation was the same before and after the storage, but the level of strike-through was worsened after storage for those of Comparative Examples 2 and 3.--

Please amend the paragraph starting at page 50, line 11 as follows.

--As described above, ~~according to~~ the present ~~invention,~~ invention provides a reaction solution that can exert its ink-destabilizing ability to the maximum without being affected by the type of polyvalent metal. This makes it possible to provide a reaction solution, a set of a reaction solution and an ink, an inkjet recording apparatus and an image recording method, with which no strike-through of a coloring material to the print backside of a recording medium occurs, high quality images of high density and improved color development performances can be obtained with stability, and with which there are no problems as to storage stability or adverse effects ~~onto~~ on the members of the recording apparatus.--